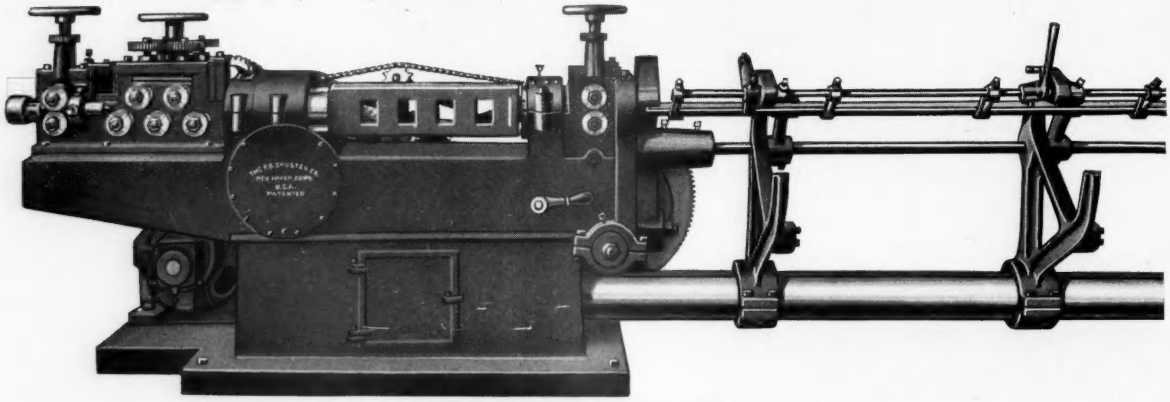
WIRE
& WIRE PRODUCTS

SHUSTER
Wire Straightening and Cutting Machinery



Direct Motor Driven Type
PATENTED

will be found in all up-to-date plants, feeding through coil after coil of wire without stopping the machine.

Makes the wire PERFECTLY STRAIGHT and cuts lengths which are ABSOLUTELY ACCURATE.

Operating costs are extremely low, because adjustments are so simple an ordinary laborer can take care of one, or more, with most of his time free for other work.

Built for the hardest kind of service, and will stand up to it for years under constant operation.

Booklet of Installation and Production Figures will be sent on request.

THE F. B. SHUSTER COMPANY
NEW HAVEN, CONN.

Formerly John Adt & Son ***STRAIGHTENER SPECIALISTS*** **Established 1866**

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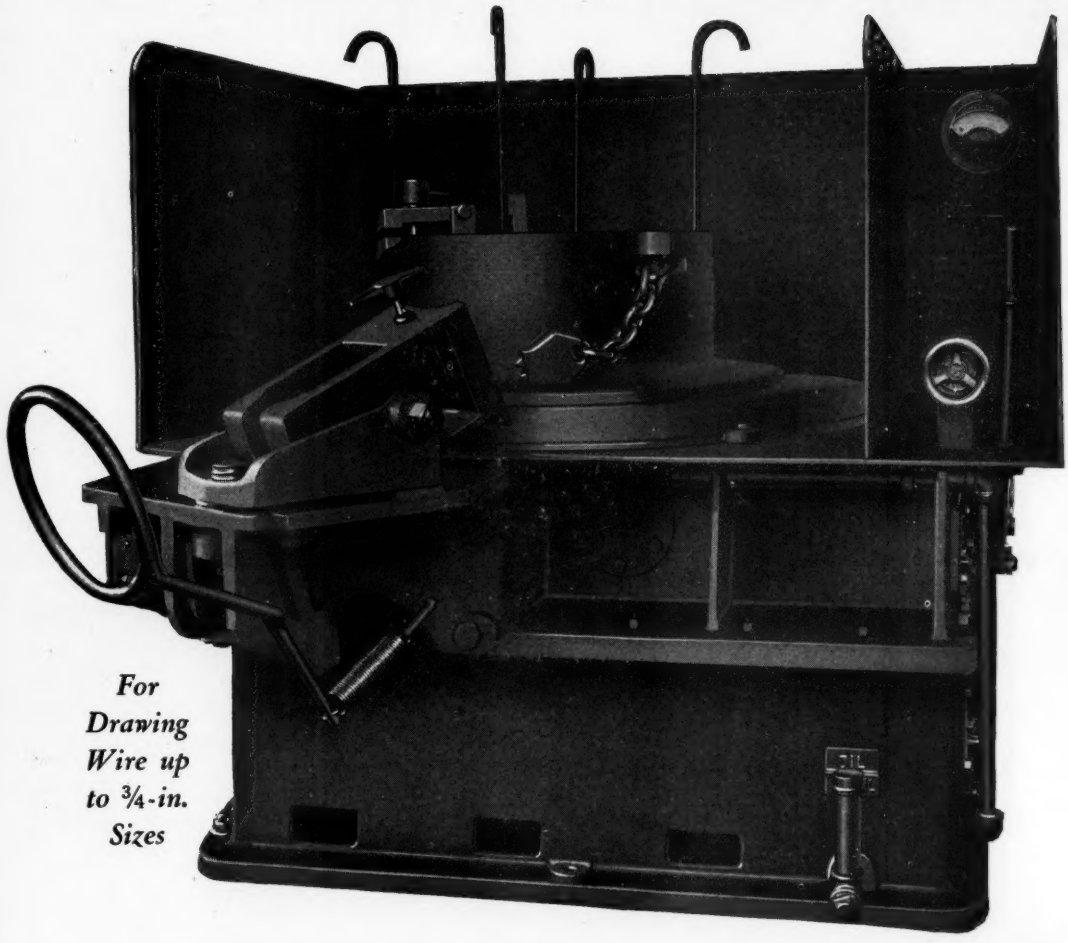
VAUGHN (LARGE SIZE) MOTOBLOCS



For Drawing Wire up to ¾-in. Sizes

WHETHER your production is altogether or only occasionally in these large sizes, the Motobloc presents real advantages worthy of your serious consideration.

Powerful and fast for drawing ¾-inch wire, it is equally efficient for drawing smaller sizes. This means that there are no idle periods.

It is this unique ability to run a large number of sizes that makes the Vaughn Motobloc a 100% producer.

Furthermore, the excellent mechanical construction employed in the Motobloc results in unusual smoothness, cleanliness and low maintenance costs.

Why not investigate its many advantages?

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Machine Works and Foundry

OF UNNA, WESTFALIA, GERMANY

FOUNDED: 1863 FOUNDED: 1863

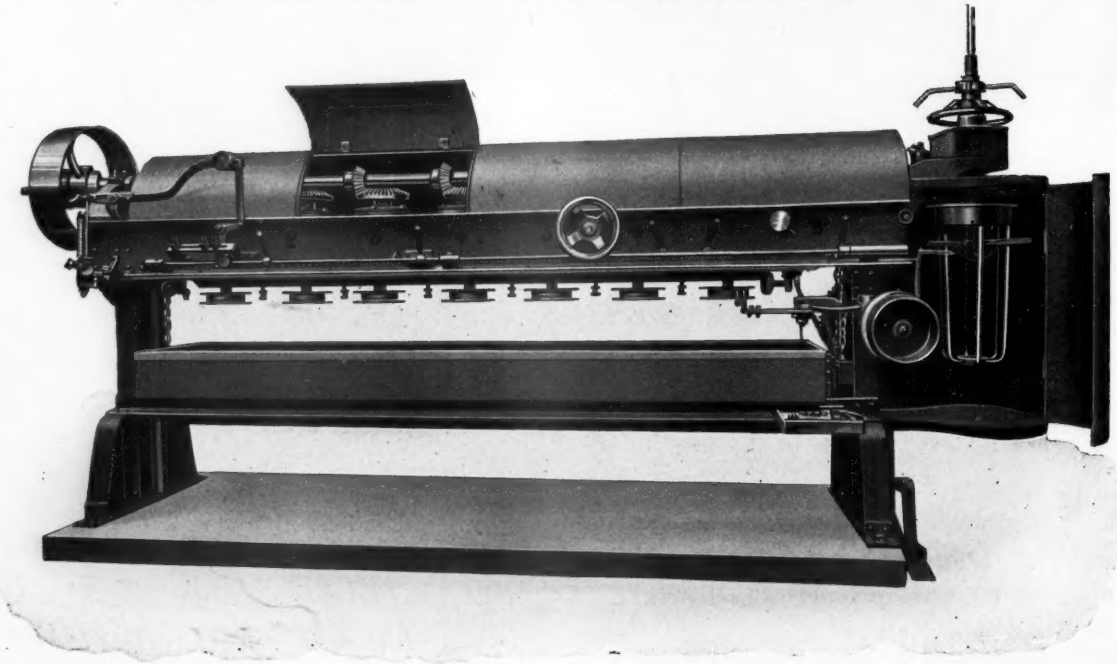
SPECIALISTS IN WIRE FORMING MACHINERY

I—PATENTED FRICTION DRAWING BENCHES of standard and special construction for light and heavy draft. Outstanding features are: spiral spring friction clutch of special design; patented spindle-gear on ball-bearings, all enclosed in oil filled casing.

II—BENCHES FOR THE DRAWING OF LIGHT AND CARD WIRE of standard and special construction.

Of Exceptional Interest Are:

1—Light and Card Wire Benches with spiral spring friction clutch for special wire.
2—Light and Card Wire Benches with instantaneous disengaging coupling.
3—Card Wire Benches with built in spooling apparatus for Rope Wire.



III—PATENTED MULTIPLE DRAWING BENCHES for Iron Wire of from 3.5 mm. dia. Drawing drums and drawing stones fully submerged in cooling drawing liquid while machine is in operation. The output of 1000 kilogr. of from 0.8 to 2.2 mm. dia. iron-wire per man per day (eight hours) is unsurpassed.

IV—SPOOLING APPARATUS equipped with individual driving gears for the Annealing and zincing of Steel Wire. All dimensions.

V—SPEED WINDLES for the respooling of zinced wire. Apparatus for Wire Washing, Spraying, etc., etc.

Sole Representative For The United States and Canada

J. I. BERNITZ

25 Beaver St.
NEW YORK, U. S. A.

437 St. James St.
MONTREAL, CANADA

IT seems that engineering standards and something of the engineering point of view in American social and political affairs are to become increasingly evident in the near future. Already there are signs of the influence of the new administration now functioning in the Nation's capitol.

Apropos of the prospect, Dr. George Otis Smith, on his recent retirement as president of the American Institute of Mining and Metallurgical Engineers, pointed out some significant possibilities.

* * *

"With the engineer", he said, "fact-facing and fact-using are all in the day's work, but fact-facing is a too uncommon practice with our statesmen, and fact-using is far from being a habit of politicians. Engineers use facts not as pieces on a chess board to be moved back and forth in a constant battle of wits, but rather as foundation stones to be assembled where needed and arranged in a fixed and logical order.

"Might it not be well in our day", he asks, "to take over into our business, social, and even political life the technique, the principles, the mental attitude of the engineer; in short, his engineering standards? There are practically no public questions today that have not engineering implications; in the words of Herbert Hoover, engineers by being a little more vocal and by acting more collectively "could transform the thought of this nation within another twenty years."

* * *

Business and industry are facing a changing attitude of public mind that should result to the advantage of all concerned. And in its own relatively restricted field *Wire & Wire Products* is prepared to do its modest share in hastening the realization of the new order.

The Publishers.

WIRE & WIRE PRODUCTS

A monthly publication devoted to wire drawing and wire forming

Vol. 4 **April, 1929** **No. 4**

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Krupp-Made

Widia Metal

and

Wallramite

Used Exclusively

in

These Dies

Why is it that European competitors are able to undersell the American wire manufacturer in spite of heavy tariff duties and transportation charges?

HERE ARE A FEW REASONS

Reduced Die Costs

They have succeeded in reducing die costs to a minimum with UN-WIDIA and WALLRAMITE dies, which in Continental practice have replaced the chilled iron, steel, and in the case of hard wire, diamond dies.

Increased Production

Production per machine has been increased from 25% to 35% due to increased drawing speed and continuous drawing with UN-WIDIA and WALLRAMITE dies.

Finer Quality Wire

The wire drawn with these dies is of a much finer quality and is made at a decreased cost.

Longer Die Life

With better quality of wire from the coarse wire machine, the diamond dies last twice as long on size when redrawing fine wire.

Reduced Labor Costs

Labor costs are reduced in direct proportion to increased machine production.

Reduced Manufacturing Costs

Die room costs are cut 75% or more and many of the usual cleaning operations are eliminated by the use of UN-WIDIA and WALLRAMITE dies.

Lower Die Costs

Considering the tonnage of wire drawn, the die cost is actually lower than that of chilled iron and steel dies.

UN-WIDIA and WALLRAMITE dies are manufactured and sold exclusively by the

Union Wire Die Corporation

Manufacturers of diamond and alloy metal dies

333 WEST 52d STREET NEW YORK CITY

WIRE
& WIRE PRODUCTS

Vol. 4 APRIL, 1929 No. 4

Results of Simplified Practice in Woven Wire Fence Industry

Manufacturers, wholesalers and dealers report their experiences with reduced styles and sizes

ON July 11 and 12, 1923, a general conference of manufacturers, distributors and users convened at the Department of Commerce, under the auspices of the Division of Simplified Practice, to consider the possibility of reducing the number of sizes and varieties of woven-wire fencing.

The conference was called at the request of the National Fence Manufacturers' Institute, which had previously appointed a committee to make a survey which would determine the styles of fence produced by the entire fence industry, including catalogue houses and all others, and the popularity of, or demand for, each style. This survey showed that a total of 552 styles of fence were being made and 2,072 different sizes of packages used in their distribution. A cumulative arrangement of sales of these various styles occupied seven closely typewritten pages.

A study of the list indicated that four pages of items could be discontinued and only affect 5 per cent of production. Indeed, the first six pages comprehended but 15 per cent of production, leaving a single page of styles which represented 85 per cent of the business done. The committee's recommendation reducing the styles of fence from 552 to 69 and sizes of fence packages from 2,072 to 138 was unanimously adopted.

September 1, 1923, was chosen as the date on which the recommendation would become effective for new production; stocks of eliminated sizes to be cleared out by January 1, 1924.

It was further agreed that the recommendation should be subject to review semi-annually and a standing committee, consisting of representatives of all branches of the industry, was created to perform this function. However, it was not until 1928 that conditions warranted further action. Meetings were held on March 28 and May 2, 1928, and 7 additional styles of fencing were eliminated, together with 21 sizes of packages. This left on the simplified list 62 styles of fencing and 117 sizes of packages. Thus by progressive elimination the variety of fencing had been reduced 89% and the packages 93%.

The extent to which Simplified Practice was applied in this case might lead to speculation on the possibilities of maintaining adherence. The fact is that adherence to this recommendation is nearly 100%. Two surveys among producer acceptors to determine the percentage of their production conforming with the recommendation showed that adherence increased from 97% to 99% between the years 1925 and 1926.

This fact alone is sufficient evidence that the manufacturers are finding the program advantageous. However, it does not

Forthcoming Features to appear in

Wire & Wire Products

"Modern Tendencies in Wire Drawing"

"Round vs. Grooved Nails"

"The Manufacture of Lead Wool"

"Drawing Metal Coated Glass Filament"

"Spring Design and Heat Treatment"

answer the question as to what the distributors and consumers think of it. With this in mind, the Division circularized all acceptors of this recommendation asking what Simplified Practice had done for them or wherein it might have failed to prove of value. The following resulted:

Manufacturers Report

Among the benefits realized by the manufacturers are: Smaller inventories, quicker turnover, reduced warehouse space requirements, and less interruption for readjustment of machinery.

One Manufacturer said: "Without Simplified Practice, manufacturers of fencing would be forced to change machines more often, and to carry larger stocks."

A Western manufacturer, after explaining that his records are not such as would permit figuring the value of simplification in dollars and cents added: "I can, however, state that there is a vast improvement in the handling of business where the Simplified Practice Recommendations have been put into effect, as it has resulted in smaller inventories, quicker turnover and the ability, of course, to move materials from stock rather than to have a lot of special specifications."

A third manufacturer wrote: "* * *The Simplified practice on woven wire fence, which went into effect some few years ago, has worked out fine. It is a good thing for the manufacturers inasmuch as they do not have to carry in stock a lot of designs of fencing, and it is also much better for the dealer for he can confine his stock to two or three heights of fence that his territory demands.

"We have never figured out in dollars and cents what the Simplified Practice means to us, but no doubt it would amount to quite a sum in the course of a year's business, although we are only small producers of woven wire fence."

Distributors

Hardware dealers, both wholesale and retail, have realized such benefits as inventory production and increased turnover. One hardware merchant said: "While we cannot state exactly the value of simplification in this particular line, we estimate that this practice has increased our net profits on fencing at least 25%. This is due to less invested capital and a much quicker turnover.

A wholesaler expressed the following opinion: "Simplified

(*Please turn to page 136*)

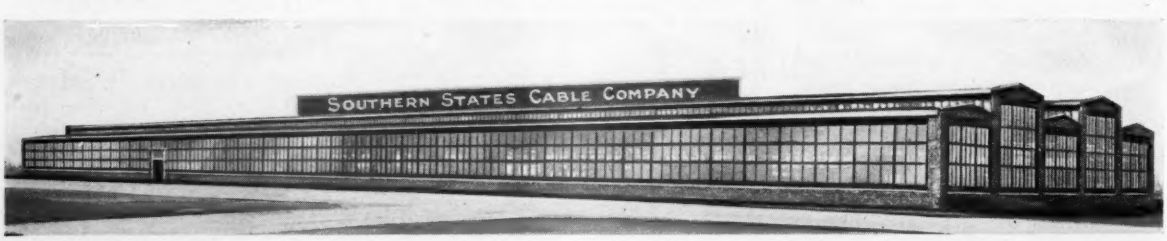
NEW SOUTHERN WIRE MILL OPENS

PUSHED rapidly to completion in order to handle much of the great electrical construction planned for the South this year, the wire mill of the Southern States Cable Company at Mobile, Ala., recently started production on the first order for electrical wire to be made in the far South. The Southern States Cable Company is a division of the General Cable Corporation, which has 18 plants in 16 cities, including one in Canada, and the Mobile plant is the first wire mill south of Baltimore.

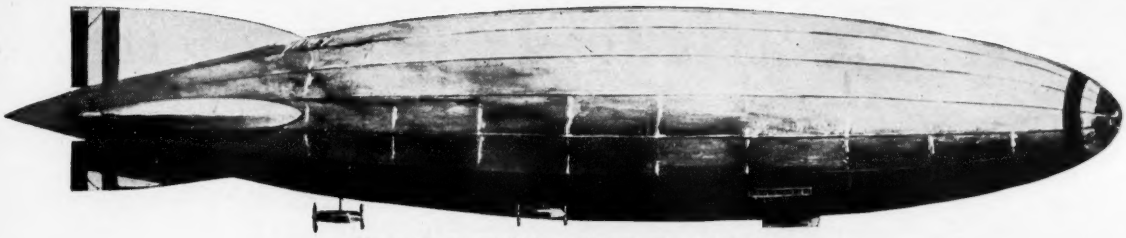
The new plant is a fine example of latest practices in industrial construction. The foundation is of concrete, with steel frame, and brick walls. A very large ratio of wall area is of glass, and this with the glass in the several monitors assures unusually good lighting and working conditions. The building is 540 feet long, and 120 feet wide, giving, with certain mezzanine construction, a total floor area of 74,000 square feet.

At the outset, the "OK" brand of weatherproof wire and also bare solid and stranded wire will be manufactured in this mill. Modern wire drawing, stranding, braiding and saturating equipment has been installed, all motor driven, power being supplied by the Alabama Power Company to the company's own transformer house for stepping down to 440 and 110 volts for plant use. Part of the new building will be used as a warehouse in which will be maintained stocks of insulated wires, cables and cords, to provide prompt service to customers. This stock includes the products of other divisions of General Cable Corporation, such as Dudlo Manufacturing Company division, Fort Wayne, Ind.; Rome Wire Company division, Rome, N. Y.; Safety Cable Company division, New York, and Standard Underground Cable Company division, Pittsburgh, Pa. The Southern States Cable Corporation will have direct sales representatives in Charlotte, Atlanta, Birmingham and Dallas.

Harry Parker of the Rome division has been appointed manager and secretary of Southern States Cable Corporation; R. M. Roberts, formerly of the Rome division, is assistant treasurer and is in charge of sales work at the mill, and H. P. Hitchcock has been appointed auditor.



New Southern States Cable Company Plant at Mobile, Ala.



The R 100, new British dirigible due here in April

Twenty Two Miles of Wire Rope In World's Greatest Airship

The employment of wire rope bracing instead of rods may represent a significant advance in modern aircraft construction

ACCORDING to present plans, the world's greatest airship, the British R. 100, will fly to the United States from England on her maiden trip sometime in April or May.

Since Count Zeppelin launched the first rigid, lighter-than-airship more than twenty-eight years ago, the engineering design and construction of these monstrous, gas-filled creatures of the air has developed apace. Indeed, the improvements made to their mechanical features have been more rapid than the actual construction of the ships themselves, for while 150 or more such ships have been built and put into operation during the past 2½ decades, the general efficiency in both design and performance of the R.100 is a far cry from that of the L-4, one of the earlier crafts which disappeared in a blizzard while patroling the North Sea.

Unique Bracing Method

Of particular interest is the unique method for bracing the enormous body of the new R.100. This is accomplished by means of preformed wire rope of varying sizes and lengths, stretched from point to point within the hull, and held by means of the compact processed fittings of the type shown in Fig. 2. These wire ropes and fittings were found to possess entirely adequate strength with greatly minimized weight and vastly increased flexibility over the rods previously used.

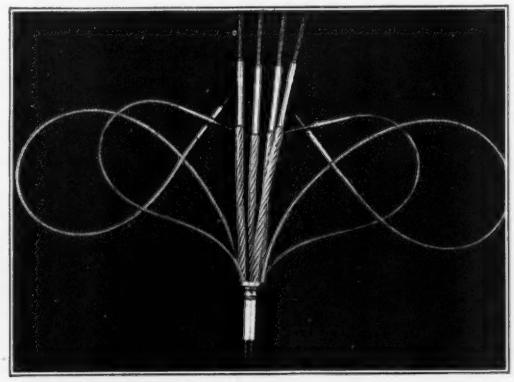
According to Brunton's of Scotland (licencees of the American Cable Company, New York) who supplied this equipment, more than 9000 processed "Tru-Loc" fittings and over 22 miles of preformed "Tru-Lay" wire rope are used in the hull of the R.100. A typical specimen of the type of fitting and wire rope assembly which is used as braces within the R.100 is shown in Fig. 2. Note the compactness of the fitting and how it has been employed to seize a number of preformed ropes of varying sizes. Note also the different type of fitting used on the ends of the individual ropes.

An indication of the enormous size and amazing capabilities of the R.100, England's latest contribution to lighter-than-air navigation, may be had by comparing it with the Graf Zeppelin, the German craft which only recently made a successful trans-Atlantic trip as her demonstration cruise. Although the Graf Zeppelin was 776 feet in length, and the R.100 only 709 feet long, the latter's gas capacity is 5,000,000 cubic feet as against the Graf's 3,750,000 cubic feet.

Larger Than Graf Zeppelin

This large increase in gas capacity comes about through the difference in diameter, the Graf Zeppelin being only 100 feet in diameter as against the R.100's 133 feet. Naturally, the larger the gas capacity the greater the possible load, so that in contrast with the Graf's limit of 20 passengers, with a crew of 30, the R.100 can carry 100 passengers together with a crew of 40, and yet have space for ten tons of freight or mail. Within its hull are dining rooms,

(*Please turn to page 140*)



A typical specimen of the type of fitting and wire rope assembly used as braces within the R 100. The compact fitting seizes a number of ropes of varying sizes and different types of fittings are used on the ends of the individual ropes.

An Electrical Test for Tin Coating on Copper Wire

A rapid, inexpensive and accurate method has many advantages over the chemical test for determining the amount of deposit

By H. M. Larsen and C. M. Underwood

Hawthorne Works, Western Electric Company

HOW an apparently complicated laboratory process can be made into a simple and practical one for use of the manufacturer is illustrated by the device described here which makes possible determining the amount of tin on tinned copper wire by electrical means. Essentially, it is a deplating process in which the quantity of electricity entering into the deplating action is measured in terms of volume of gas evolved from a suitable electrolyte in a separate container.

Determining the amount of surface tin on tinned copper wire electrically instead of chemically has the desirable advantage of saving time and cost of testing. It is possible to ascertain the amount of free surface tin separate from the amount of underlying tin-copper alloy on wire and doing it within a practical degree of accuracy by relatively unskilled operators. Short lengths of wire may be tested to determine uniformity throughout a spool of wire.

Based On Faraday's Law

This process was originally proposed in 1917 by Mr. C. G. Grower before the American Society of Testing Materials. A complete description of the process and results of tests at that time may be found in the Proceedings of the Society in Volume XVII, Part II, 1917. The process is based upon Faraday's law; namely, the amount of chemical action in an electrolyte is proportional to the quantity of electricity flowing. In terms of the test set shown in Figure 1, this means that the amount of gas evolved at the electrical terminals in the glass containers on the right is a measure of the amount of current flowing in the circuit, which in turn is a measure of the amount of tin on the sample.

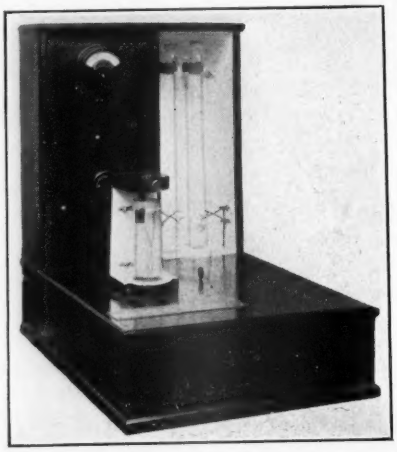


Fig. 1—The amount of gas evolved at the electric terminals in the glass containers on the right side of the test set is a measure of the amount of current flowing in the circuit. This in turn is a measure of the amount of tin on the sample clamped in the jar of sulphuric acid in the foreground.

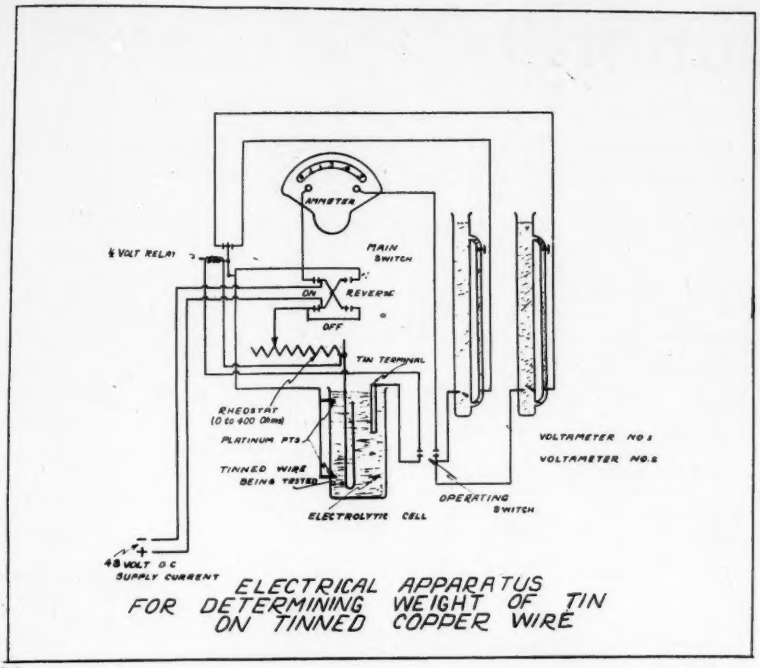
The test set shown in this article may be used for determining milligrams of tin per square cm. of surface on copper wire of sizes about 25 mils in diameter. It is particularly useful in connection with experiments on tinned wire where it is desired to know quickly the results of a run. Determinations made chemically require considerable time, are relatively expensive, and require careful attention of a chemist. Determinations made electrically on a test as described here require only about 90 seconds per determination. The cost is thereby reduced and the operation requires very little attention.

The operation of the process is as follows: As shown in the photograph, Figure 1, and in the circuit diagram, Figure 2, a test sample of tinned copper wire of known length is put into the circuit and clamped in place in the low glass jar containing dilute sulphuric acid of proportions 1:10. In the walls of this jar are two platinum terminals connected in common forming a second electrode to which the deplated tin ions pass from the sample. Submerged in the electrolyte is also a pure tin terminal connected in an independent circuit in series with a sensitive relay, which operates when across a potential of .5 volt. This circuit is introduced to separate automatically the gas evolved by the surface tin from that evolved by the tin-copper alloy in the two respective glass containers (sometimes called voltameters) at the right. This switching could be done manually using a voltmeter as an indicator, but not as accurately.

Routine of Electrical Test

The two glass containers each are filled with 1:10 dilute sulphuric acid and have electrical terminals extending through the walls, one terminal in the container proper and the other in the small part graduated in cubic centimeters. From this terminal is evolved either hydrogen or oxygen when current passes through the electrolyte, depending upon the direction of flow. In the results given in this article, the terminal in the graduated part is connected to emit hydrogen gas. Suitable switches, a rheostat, and an ammeter reading .5 ampere, are connected in the circuit.

The action is as follows. For



ELECTRICAL APPARATUS FOR DETERMINING WEIGHT OF TIN ON TINNED COPPER WIRE

wire 25 mils in diameter a current of about .25 ampere, from a 24 volt D. C. source, is used to deplate the tin onto the platinum terminals in the low glass jar. Immediately, electrolysis of the acidulated water occurs, hydrogen gas is evolved in the graduated container at the extreme right and is trapped at the stop cock, where the scale reading is O. As tin is electropositive to alloy no alloy will be deplated as long as any appreciable amount of tin is left.

As soon as all of the tin is deplated a potential of about .5 volt occurs between the pure tin terminal and the alloy in the sample, operating as a galvanic cell, causing the relay to operate and instantly switch the current to the second container. Thus, the amount of hydrogen gas in the first container is a measure of the free surface tin. The action of deplating the alloy is not definite and it becomes necessary to stop action manually when the dark gray alloy turns to a bright copper color. A little experience at this gives fairly consistent results. Any error in total tin would be small as the amount of tin in the alloy is usually but a fraction of the amount of surface tin.

On larger wires more current may be used. Heavy current on small wires may raise the current density to an undesirable amount and cause gassing along the wire. When the platinum terminals in the large jar become coated the current may be reversed, by means of the reversing switch, and the tin deposit thrown off in a few seconds. The electrolyte has no appreciable corrosive action on the wire. It can be used repeatedly, 50 to 100 times, without change.

The formulae for calculating the tin in terms of cc of hydrogen gas are:

$$\text{Free tin} = \frac{29\ V_1}{d}$$

$$\text{Tin-Copper Alloy} = \frac{7.25\ V_2}{d}$$

Where V_1 = CC of hydrogen in container No. 1
V_2 = CC of hydrogen in container No. 2
d = Diameter of wire in mils.
Length of test piece = 20 cm.

The coefficient of the first formula is based upon the electro chemical constant for tin and allows for normal contamination of copper solution in the tin. The second is derived empirically.

Results are in milligrams of tin per square cm. of surface.

The curves in Figure 3 show the relationship between the Grower process and chemical anaylsis from data on numerous samples. Curve No. 1 records results of the electrical determination arranged in the order of ascending amounts of tin per square centimeter. Curve No.

(*Please turn to page 140*)

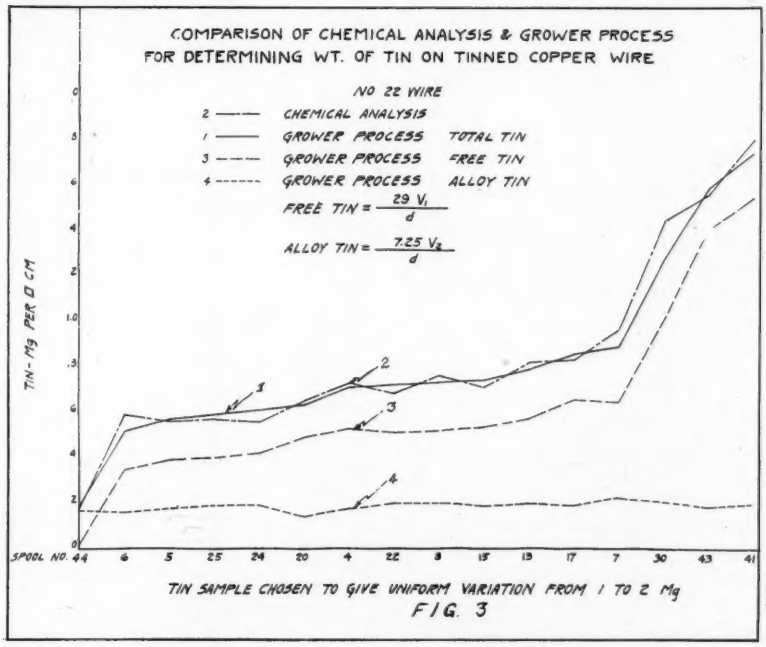

COMPARISON OF CHEMICAL ANALYSIS & GROWER PROCESS
FOR DETERMINING WT. OF TIN ON TINNED COPPER WIRE
NO 22 WIRE
2 —— CHEMICAL ANALYSIS
1 —— GROWER PROCESS TOTAL TIN
3 —— GROWER PROCESS FREE TIN
4 ------ GROWER PROCESS ALLOY TIN
FREE TIN = 29 V1 / d
ALLOY TIN = 7.25 V2 / d
TIN - Mg PER □ CM
SPOOL NO. 44 6 5 25 24 20 4 22 8 15 13 17 7 30 43 41
TIN SAMPLE CHOSEN TO GIVE UNIFORM VARIATION FROM 1 TO 2 Mg

FIG. 3

The Evolution of the Screw

A seemingly commonplace wire product has had an interesting history of successive improvements in threading, pointing and quantity production

By Herbert Manchester

SCREWS used in this country as recently as the time of the Revolution were still blunt on one end so that holes had to be bored for them in the wood. Our account deals with the subsequent history of the screw, more particularly after it had advanced to the stage where drawn wire was used for stock. Our selection is from the much fuller text of an interesting new booklet recently published by Parker-Kalon Corporation of New York, manufacturers of self-tapping metal screws.

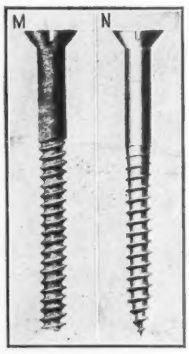
ABOUT 1800, when the introduction of machinery began to create a demand for machine screws, Henry Maudslay, inventor of the slide rest for the lathe, found that every screw was a thing apart, no one fitting in a hole bored and tapped for another. Bolts and their nuts had to be tied together and if they became mixed it led to endless confusion. Through his efforts and aided by special equipment which he designed for the purpose, Maudslay brought about a uniform thread which went far toward making screws of the same size interchangeable. This was of the greatest advantage not only in manufacture, but even more in making repairs.

The Introduction of Wire

In 1817 an important step in screw making was made by Colbert, a German clock maker, in introducing drawn wire instead of forged rods for screw blanks. Gradual improvements had at length made wire much cheaper and far more uniform than forged rods for this purpose.

The increased use of machinery was again forcing attention to the need for a uniform thread in machine screws, and in 1841 Sir Joseph Whitworth, who had been a pupil of Maudslay, began by example, lectures and writings to urge a uniform system which would be accepted and put into practice by all screw manufacturers. The thing was, that if there were the slightest difference in the thread of the screw and of the tap that was used to thread the hole for it, the screw would either stick or work loose under vibration. In case of repairs or renewals, it was necessary to drill and tap a new hole that would fit a screw on hand. Whitworth kept up the campaign for uniformity for years, and his standards were gradually accepted in England and to a lesser extent in the United States.

An epochal revolution in the form of the screw was produced about 1846. In the thirties several patents were issued on screws for use in wood, which would do away with the necessity of boring a hole as big as the solid cylinder before the screw could be screwed in; but these screws were not entirely satisfactory. Finally, in 1842, Cullen Whipple patented a machine that would make a screw with a "gimlet end". Thomas J. Sloan in 1846 also patented a gimlet screw which was made practical by Wm. G. Angell soon afterwards. The advantages of this new type were obvious, and the American screw making companies rapidly turned their attention to its manufacture.



M—Wood screw of 1776 with thread cut out of forged rod. The blunt end required that a hole be bored for it in the wood. N—A modern machine-made wood screw from drawn wire stock.

An interesting account of screw making in England in 1882 is preserved in a magazine edited by Charles Dickens: "The heads of the heavy bolts were forged by men, but in producing the ordinary screws nine-tenths of the workers were women. The coils of wire which came in from the wire drawers were fed into machines which snipped off the proper lengths. The head was stamped or upset by a machine, and polished by another machine, while a mixture of soapsuds and oil was kept constantly dripping over the metal to keep it from getting too hot, incidentally smearing the women's hands and arms. In slotting the heads the screws were inserted by the women into the holes of a revolving barrel, which carried them beneath a cleaver which nicked a row at a stroke. To cut the thread, the screws were placed one by one in a vise which carried the screws forward and backward and revolved them against cutters until the worm was cut to pattern. The screws were then 'cooked,' as it was called, in sawdust and dried in sieves, counted by weight and packed by hand."

Steps in Screw Manufacture

Each machine, it will be observed, was then confined to a single process and the screws had to be fed into the machine one at a time by the worker, so that the manufacture was in no sense automatic.

The first step toward facilitating the making of screws had been taken when the lathe and other machines were introduced, but a worker still had to feed every screw separately to each machine.

The second step was the invention of machines which could be fed in bulk through a

hopper and performed more than one operation. The first of these partly automatic screw machines was that patented by Thomas J. Harvey in 1846, which was soon used in modified form by the principal American companies.

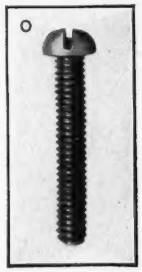
About 1850 one machine, into the hopper of which screw blanks could be poured in bulk, turned the heads, sawed the slot, and shaved off the burr from sawing. And another machine, likewise fed in bulk, formed the point and cut the thread. These were sufficiently automatic so that one person could attend to several machines. By 1850 these machines had cut the price of screws in half.

The Rolled-Thread Process

From the beginning, the blank for the screw had been made from solid bar or rod and the thread was cut out. By this method, considerable material was wasted. Toward the end of the century the idea was conceived and developed for using a blank of smaller diameter and extruding the thread, now known as the rolled-thread process. In this process the screws are headed cold, and rolled cold between one stationary and one movable die. The density of the metal is increased by rolling, there is no loss of metal, and the dies in rolling do not wear out as quickly as in cutting the thread.

The operation of inserting a screw into metal had always required careful drilling and tapping. The hole had to be made just the right size; in the tapping, the thread had to match exactly the thread of the screw. The taps were certain to wear and frequently broke, and the upkeep of the tapping machinery was an important item. Even more important was the time required for tapping, which was in many cases a costly operation.

Moreover, when it came to joining light gauges of metal or making fastenings to thin sections of metal, it was an even more difficult job because the metal lacked sufficient thickness in which to tap a thread. On such assembles it was necessary to resort to various costly and time-consuming expedients.



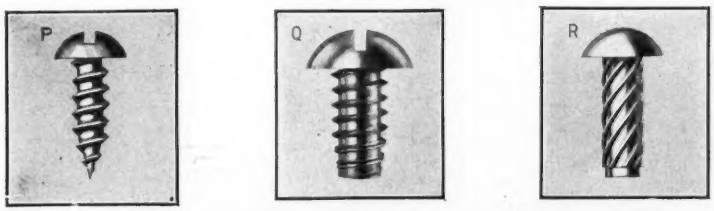
O—Example of modern rolled-thread machine screw. In this process the screws are headed cold and rolled cold between one stationary and one movable die. The blank used is of smaller diameter than the thread, which is extruded.

These conditions at length gave rise to the thought in the brain of Heyman Rosenberg that it would be possible to make a screw which would tap its own thread in a hole drilled or punched in sheet metal, thereby eliminating the expensive and troublesome tapping operation and at the same time obtain an effective anchorage or fastening. He experimented on this idea and in 1917 perfected what is now commonly known as the self-tapping screw, which successfully accomplished these results. A patent was duly granted on this screw and later several other patents were issued to Rosenberg on various kinds of screws, all embodying the self-tapping principle. Some of these were designed for use in solid materials, such as iron, brass and aluminum castings, steel, Bakelite and other compositions, etc.

At first, the public was skeptical about these inventions and improvements. The idea of a screw that did away with tapping and combining the qualities of a tap and a screw seemed too good to be true. They doubted its efficacy. But as time went on, and the screws actually did what was claimed for them, they were gradually adopted by leading firms in every branch of the metal working industry and today they are universally used in place of machine screws, stove bolts, rivets and other means of joining metal to metal and making fastenings to metal.

Self-tapping screws have revolutionized metal assembly practice in more than 60,000 plants in the United States and in many foreign countries. Their value to American industry especially, in incalculable. In the automotive industry alone they are saving hundreds of thousands of dollars a year in time and labor, and the economies effected through their use in other metal working industries easily brings the total well up into the millions.

Such is the evolution of the screw. However interesting and important have been the developments in the past, there is little doubt that even greater and more valuable contributions to screw practice and the art of screw manufacture will be made in the future. American industry offers fame and wealth to inventors of devices and methods that reduce costs, speed up production and improve manufacturing processes; and with such rewards to spur them on, the ingenuity of the illustrious pioneers in screw design must continue to assert itself.



Three types of hardened screws that tap their own threads in a hole drilled or punched in sheet metal. P and Q are turned in with a screw driver after punching, drilling or piercing the metal. R is hammered into a hole drilled to the proper size.

Welding Characteristics of Copper Alloys

Widely varying compositions of brass and bronze are weldable when proper precautions are taken

COMMERCIAL copper alloys may be classified in two groups according to whether zinc or tin is the principal alloying metal. Those which contain tin are correctly designated as bronzes. The zinc content of commercial brasses is from 30 to 40 per cent, and the true bronze may have from 8 to 25 per cent tin although the bronzes most frequenty encountered sedom have more than 10 per cent of tin.

It is well to emphasize that the term "bronze" is frequently applied in the trade to alloys that do not contain any tin and are not therefore true bronzes. Thus manganese bronze and the welding rods used for the bronze-welding are really brasses as they contain zinc.

Alloys Vary Greatly

Other metals are sometimes added to these copper alloys in order to obtain improved qualities for special purposes. For example, the machinability of brass is increased by the addition of lead in small amounts, up to about 1½ per cent, and certain types of bronzes used for bearings may contain as much as 25 per cent lead. Aluminum, phosphorus, nickel, iron and manganese are also used in certain special cases.

As the actual number of these alloys in commercial use is enormous, it is frequently impossible for the welder to know exactly what alloy he is working on. In many cases it is even impossible to tell whether the alloy is a brass or a bronze unless a chemical analysis is available. It is evident that no general welding can be laid down to fit such a wide variety of compositions, but there are a few principles that may be followed by the welder to advantage.

Many of these alloys resemble copper in being weak or brittle when hot. Here again it is not possible to make any generalization, as brass containing 30 per cent of zinc is very ductile when cold but cannot be forged hot, while brass containing 40 per cent of zinc can be forged hot although it is less ductile when cold than the 30 per cent alloy.

This possibility of weakness when hot should be taken into consideration particularly in welding large pieces of these copper alloys. While preheating may bring the edges to be welded to the proper temperature, there is a zone away from the weld that is at a lower temperature and may be weak enough to crack under shrinkage stress. It is therefore advisable to preheat all brass or bronze pieces with the possible exception of very small ones, handle them carefully while hot, reheat after welding and allow them to cool very slowly.

Choice of Rods and Flux

Although brasses and bronzes have a higher conductivity than steel, their melting points are lower and the molten weld metal unites readily with the edges of the vee in some cases where the edges are not actually fused. This action is of course similar to that encountered in bronze-welding cast iron and steel. Consequently it is not necessary to use a larger blowpipe tip than is used for steel of the same thickness.

Because of the wide variation in chemical composition it is usually not possible to use a welding rod of exactly the same composition as the alloy being welded. Standard welding rods such as Oxweld No. 10 bronze, No. 11 manganese bronze and No. 13 drawn brass will be found satisfactory in most cases, although under certain special conditions it may be necessary to develop special welding rod in order, for example, exactly to match the color of a brass or bronze object.

Brazo flux should be used but care should be taken not to use more than is absolutely necessary as a large excess might tend to make the weld porous and is difficult to remove from the finished job.

Brass Fumes Distinctive

Under the welding flame molten brasses usually give off heavy white fumes of zinc oxide, while the true bronzes give off relatively little fume. This characteristic is sometimes useful in distinguishing brasses from bronzes although it does not apply to all compositions. In working with brass the welder should try to avoid inhaling the fumes of zinc oxide. Although these fumes are not poisonous, inhaling them for any length of time may produce nausea.

The work should always be done in a well-ventilated location. If it is necessary to weld brass in confined quarters, a fan or some other means of forced draft should be used to remove the fumes. If a feeling of discomfort is still experienced, the welder should drink milk at frequent intervals while he is working.

Lead in any quantity makes

(*Please turn to page 138*)

Reprinted from "Oxy-Acetylene Tips"

Making Bismuth Wire by the Extrusion Process

A metal that cannot be drawn by ordinary means is satisfactorily formed by special apparatus

By Donald C. Stockbarger
*Massachusetts Institute of Technology**

IN the course of radiometric investigations during the past few years we have needed better materials for building thermopiles than copper and constantan. Considering thermoelectromotive force, electrical and thermal conductivities and ease of handling it appears to be believed generally that the bismuth-silver conbination is the most satisfactory.

Combinations yielding higher thermoelectromotive forces per degree temperature difference can be found but usually the gain is offset by high electrical resistance, and the junctions may be too fragile for practical use. For a good discussion of this matter, see a paper by Coblentz entitled "Various Modifications of Bismuth-Silver Thermopiles Having a Continuous Absorbing Surface."

Replacing Crude Process

Bismuth cannot be drawn by ordinary means, and therefore a number of methods for producing wires have been offered from time to time. They have usually consisted in dropping the molten material from a height upon a smooth perfectly clean glass plate whereby the metal was made to spatter out into a thin plate which could be rolled thinner and cut into narrow strips, or else it was made to spatter in the form of thin flat threads. Pfund has described a similar method which enabled him to produce longer, finer filaments.

Occasionally mention is made of fine round bismuth wires and a few years ago the writer saw some that were being used in the construction of scientific instruments. Evidently these had been produced by extrusion, but if anything was published concerning the method and apparatus it has escaped the writer's notice. Bridgman, however, published a note concerning the extrusion of antimony and tellurium wires and thanks are due to him for suggestions which led to the development of the apparatus herein described. Employing a modification of Bridgman's apparatus the production of bismuth wires has been made easy and the results are so gratifying that it seems worth while to pass the idea along.

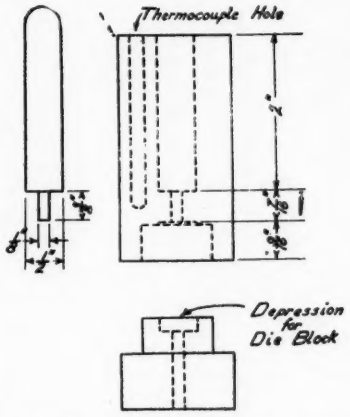


Fig. 1—Sketch showing principal dimensions of extrusion piston and cylinder. The support for the die block shown beneath the cylinder can be screwed into the cylinder or held by machine screws.

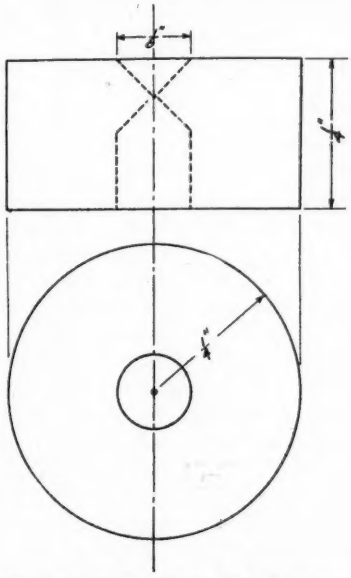


Fig. 2—Die Block. The size and shape of orifice as well as the angle of approach can be varied to suit the requirements.

The extrusion press is shown diagrammatically in Fig. 1. All parts are made of high speed tool steel, accurately ground and lapped to size where required and carefully heat treated. The die block, Fig. 2, in use at present has an orifice 0.004 inch in diameter by 0.002 inch in length. The side of the cone of approach makes an angle of 45 degrees with the vertical axis. The dimensions are satisfactory for bismuth and bismuth-tin alloys but probably would have to be changed for some other materials.

Heat Expedites Results

In operation, either a small slug or else a quantity of powdered bismuth is placed in the ⅛ inch cylinder, the pistons and die block put in place, the whole electrically heated to a temperature somewhat below 100°C., and a pressure applied on the end of the ½ inch piston by means of hydraulic press. After a few minutes the wire begins to appear and continues to be extruded as a single piece until the capacity limit of the apparatus has been reached.

(*Please turn to page 139*)

*Reprinted from the Journal of the Optical Society of America.

NEWS *of the* INDUSTRY

Foreign Trade Opportunities

FOREIGN trade opportunities reported by the U. S. Bureau of Foreign and Domestic Commerce during the month of March include inquiries from the following sources: For machine bolts and nuts (36660) from San Juan, P. R., copper conductor wires for electrotechnical uses (36927) from Rome, Italy; wiring supplies (36926) from Calcutta, India; wiring supplies and fixtures (36955) from Winnipeg, Canada; aerial rope conveyors (36858) from Alexandria, Egypt; steel springs and steel for spring manufacture (37038) from Berlin, Germany.

To Salvage Scrap Cable

MR. F. S. Chase, Chairman of Highway Safety and Scenic Restoration Committee of the Manufacturers Association of Connecticut has suggested the use of discarded elevator cables in the construction of highway guard rails. As a result of this timely suggestion, the state highway department will save money as well as the manufacturers who may now dispose of former scrap at higher prices. All manufacturers wishing to dispose of used elevator cable should communicate with Mr. George E. Hamlin, Supt. of Repairs, State Highway Department, Hartford, Connecticut.

This is Shop Waste Month

A SHOP waste campaign during April is being urged and cooperated in by the Management Division and Local Sections of the American Society of Mechanical Engineers. Industries in many lines are making graphic appeals through shop exhibits, employee organizations, posters, printed matter, etc., in a special effort to save both time and materials during the current month. One company estimated its savings as the result of a special Waste Week campaign at over $250,000. Some of the circular matter distributed to department heads in waste campaigns conducted by Westinghouse Electric & Mfg. Co. and Newport News Shipbuilding & Drydock Co. are being distributed by the A. S. M. E. and may be obtained by addressing Mr. P. T. Wetter, Professional Division, 29 W. 39th Street, N. Y. C.

Define Heat Treating Terms

THREE new definitions of terms relating to heat treatment operations widely employed in wire industries have been recommended by a Joint Committee representing the American Society for Steel Treating, the American Society for Testing Materials, and the Society of Automotive Engineers. The new definitions follow:

Full Annealing. — Heating iron-base alloys above the critical temperature range, holding above that range for a proper period of time followed by slow cooling through the range.

Note: — The annealing temperature is generally about 100 degrees Fahr. (55 degrees Cent.) above the upper limit of the critical temperature range, and the time of holding is usually not less than one hour for each inch of section of the heaviest objects being treated. The objects being treated are ordinarily allowed to cool slowly in the furnace. They may, however, be removed from the furnace, and cooled in some medium which will prolong the time of cooling as compared to unrestricted cooling in the air.

Process Annealing. — Heating iron-base alloys to a temperature below or close to the lower limit of the critical range followed by cooling as desired.

Note:—This heat treatment is commonly applied in the sheet and wire industries and the temperatures generally used are from 1020 to 1200 degrees Fahr. (550 to 650 degrees Cent.)

Patenting. — Heating iron-base alloys above the critical temperature range followed by cooling to below that range in molten lead maintained at a temperature of about 700 degrees Fahr. (365 degrees Cent.)

Note: — This treatment is usually applied in the wire industry either as a finishing treatment or especially in the case of eutectoid steel as a treatment previous to further wire drawing. Its purpose is to produce a sorbitic structure.

Industrial Museum Proposed

ESTABLISHMENT of a National Museum of Engineering and Industry is proposed in a bill (S. 5848) introduced in the Senate by Senator Copeland (Dem.), of New York, and referred to the Committee on Education and Labor. The purpose of the measure, it was explained, is to provide a building or buildings to house the Government's collection of machinery and other materials showing industrial and engineering development in the United States and to exhibit private collections now housed in various places throughout the country. A tentative site covering approximately 100 acres at the eastern end of Washington, D. C., has been approved by the National Capital Park and Planning Commission.

The bill would set up also a commission of nine members,

to be appointed by the President as follows: An engineer, an industrial chemist, a manufacturer, three persons experienced in transportation by land, water and air, respectively, an educator, a representative of labor, and a museum expert. The commission shall submit a report of the result of its investigations, together with its recommendations, to the President and to the Congress on or before June 30, 1930, and it shall cease to exist on such date.

A. S. M. E. Program at Detroit

COME to Detroit and take away a thousand new ideas on increasing production at less cost. This is the message that the National Management and Materials Handling Meeting of the American Society of Mechanical Engineers to be held in Detroit at the Book-Cadillac Hotel on May 1, 2 and 3, has for industry and the engineering profession. The concrete results of this meeting to manufacturing executives and plant engineers should be of great value. The program presents the very best that Detroit has devised in the way of improved methods of handling and management. The papers of the meeting are presented by leaders in their field and will be discussed by many experts. The arrangements to visit plants during the morning of each day give a wonderful opportunity to vividly grasp the ideas that are presented in the prepared papers.

Building and Expansion

Weaver Brothers Company, manufacturers of pickling equipment and chemicals, has moved plant from Clinton to Adrian, Michigan, and will expand.

John A. Roebling's Sons Co., Trenton, N. J. manufacturer of wire rope, cables, etc., has awarded general contract to John W. Ferguson Co., Paterson, N. J. for addition, primarily for storage and distribution, to cost $125,000 with equipment.

COMING EVENTS

April 6-14. All-American Aircraft Show, Detroit, Mich. Convention Hall, Board of Commerce.

April 8-12. American Foundrymen's Assn. at Chicago. Secretary, C. E. Hoyt, 222 W. Adams St., Chicago.

April 15-17. American Zinc Institute at St. Louis. Secretary, S. S. Tuthill, 27 Cedar St., New York.

April 24-25—Convention of the National Metal Trades Association at the Drake Hotel, Chicago, Ill. J. E. Nyhan, National Secretary, Peoples Gas Building, Chicago, Ill.

April 24-26—Annual meeting of the American Welding Society at the Engineering Societies Building, 29 W. 39th St., New York City. M. M. Kelly, Secretary, 28 W. 39th St., New York City.

May 6-11. Chemical Show. Grand Central Palace, New York City. International Exposition Company; F. W. Payne, President.

May 7. International Exposition. Seville, Spain. Hon. Thomas E. Campbell, U. S. Commissioner.

May 27-30 — Third National Aeronautic meeting, American Society of Mechanical Engineers at St. Louis. Calvin W. Rice, Secretary, 29 W. 39th St., New York City.

June 3-6. National Assn. of Purchasing Agents at Buffalo. Secretary, George A. Renard, 11 Park Place, New York.

June 5-7. Canadian Electric Railway Assn. at Montreal. Secretary, E. Smith, Jr., 35 Yonge St., Toronto.

June 17-22—Twenty-fifth Annual Iron and Steel Exposition. William Penn Hotel, Pittsburgh, Pa.

June 24-28. Annual meeting, American Society for Testing Materials, Chalfonte Haddon Hall Hotel, Atlantic City, N. J. C. L. Warwick, Secretary, 1315 Spruce St., Philadelphia.

July 1-4. Summer meeting, American Society of Mechanical Engineers at Salt Lake City, Utah. Calvin W. Rice, Secretary, 29 W. 39th St., New York City.

July 8-11. Annual Convention, American Electro Platers' Society, at Detroit, Mich.

Seward Wire Company, Parkersburg, W. Va., will build and equip an addition to its Camden Avenue plant at an estimated cost of $25,000.

The Canadian Westinghouse Company plans erection of a new unit in Hamilton, Ontario, for manufacturing and testing large power transformers at an estimated cost of $300,000.

MacWhyte Co., Kenosha, Wisc., manufacturers of aircraft wire, wire rope, cable, etc., announce the appointment of Jessel S. Whyte as general manager and Herbert E. Sawyer as general sales manager.

Standard Underground Cable Co., a subsidiary of General Cable Co., New York, plans an addition to its Perth Amboy, N. J., plant at an estimated cost of $200,000.

Nachman Springfilled Co., 2241 South Halsted St., Chicago, has completed plans for taking over the business of Kay Manufacturing Co., 22 Warren St., Brooklyn, New York, manufacturers of furniture springs.

General Plate Co., Attleboro, Mass., manufacturers of jewelers' wire, will build and equip a new factory addition at an estimated cost of $50,000.

Orrin Screw Co., formerly of Jackson, Mich., has been reorganized and moved to Stockbridge, Mass.

Keystone Steel & Wire Co., Peoria, Ill., is planning extensive additions to present factory as part of new expansion program.

General Cable Corporation, 420 Lexington Ave., N. Y., is moving its plant at Newark, N. J., hitherto devoted to the manufacture of magnetic copper wire coils, etc., to Rome, N. Y.

Maring Wire Co., Muskegon, Mich., is planning additional plant facilities to be built and equipped at an estimated cost of $140,000.

Glove Wire & Iron Works, 1009 Atkinson Ave., Milwaukee, manufacturers of ornamental iron, bank and office fixture enclosures, etc., will build a new plant on Capitol Drive.

Dudlo Mfg. Co., Fort Wayne, Ind., manufacturers of covered wires and cables, will build and equip factory addition at an estimated cost of $170,000.

Sleeper & Hartley
TRADE MARK

Practical Continuous Wire

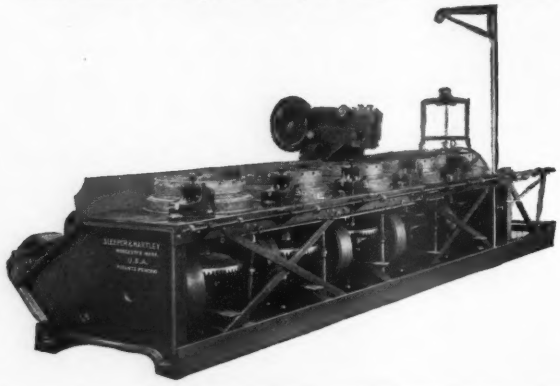
These Machines Go Into Production at (Factory)—R

Rod Frame

(No. 5—14 or 15 wire)

Patented June 3, 1924—May 12, 1925—others pending

All Ball or Roller Bearings
No Differential Gearing.
Automatic Compensation for Speeds of Heads.



Double 5-Draft, [illegible]

No. 14 to No. 23, [illegible] or l
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No. 14 to 19—4 h[illegible]400
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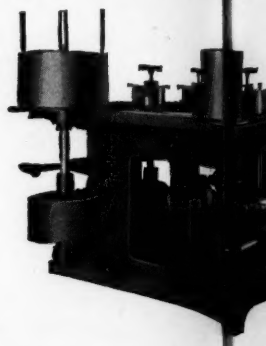
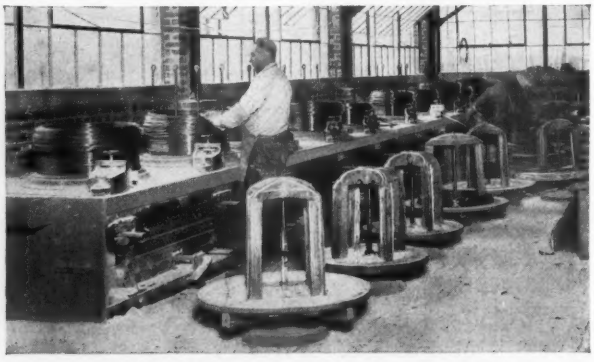
More than 270 heads of th[illegible]prov

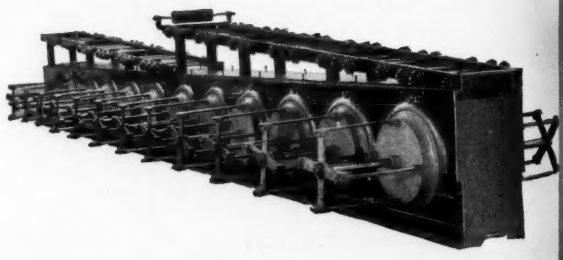


IMPROVED WIRE MILL EQUIPME[illegible]



Standard Rod Frame—10 Block

Long, Stiff Spindles, in anti-friction bearings, and equipped with friction Clutches. Powerful and reliable.
Practically noiseless in operation.
(New Plant of Thompson Wire Co., Worcester, Mass.)



Patenting Furnace Take-Up

(New Plant of Thompson Wire Co., Worcester, Mass.)

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AGENTS: CHICAGO TERRITORY
Neff, Kohlbusch & Bissell, Inc.

SAN FRANCISCO AND LOS ANGELES
Louis G. Henes

SLEEPER & [illegible]A

FOREIGN AGENTS AND REPRESENTATIVES: UNITED KINGDOM—Mr. Fredk. A. Perry, 63 Queen Victoria St., London, E. C. 4.
FRANCE—Mr. Edgar Bloxham, 12 Rue du Delta, Paris. MONTREAL AND TORONTO—Arthur Jackson Machine Tool Co.

WORCESTER MA

Wire Drawing Machinery

Sleeper & Hartley TRADEMARK

—Reducing Overhead—Increasing Production!!

Craftsy, Intermediate

23. or low carbon wire.
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—4 h 400 lbs. per block.
—5 h 100 lbs. per block.
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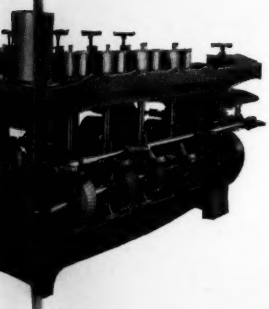
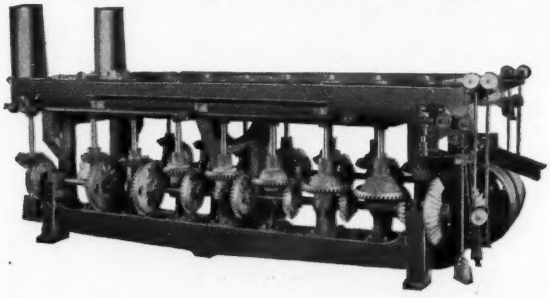


Double 8-Draft Fine Wire: Wet

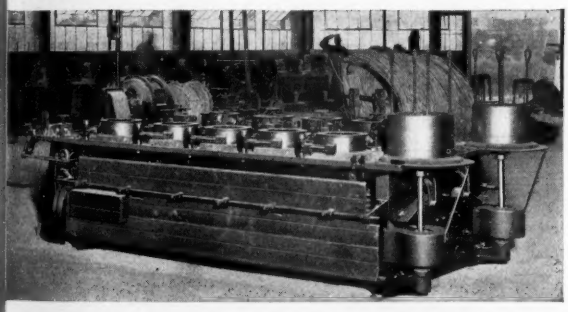
No. 22 to 36. High or low carbon wire.

6 Blocks to Average Operator, 22-33, 8-hole, 660 lbs. per day of ten hours.

Many thousands of these heads in operation



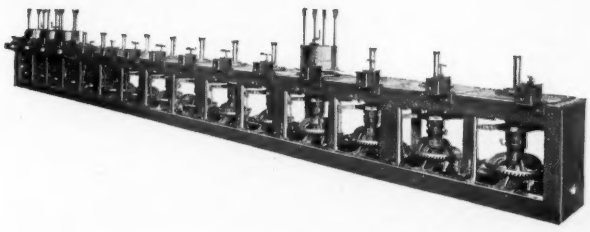
UIPMENT RECENTLY INSTALLED



Double Six-Draft Dry Continuous For High Carbon Wire

Direct driven with silent chain. Cut gears throughout. Anti-friction bearings. Variable speed for finishing block.

(New Plant of Thompson Wire Co., Worcester, Mass.)



Heavy 16" Frame For .65 Carbon Wire No. 10½ to .037"

15 Blocks: Motor driven. Silent chain. Anti friction bearings and cut gears throughout.

(New Plant of Johnson Steel & Wire Co., Worcester, Mass.)

& HARTLEY, Inc.

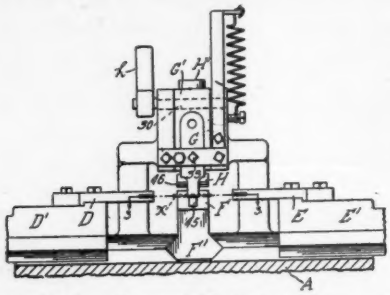
Agents: Philadelphia Territory
Swind Machinery Co.

ITALY—Henry Coe & Clerici, Milan. AUSTRALIA AND NEW ZEALAND—Edwin Wood Pty., Ltd., Melbourne.
JAPAN—Andrews & George Co., Tokyo. SWEDEN AND FINLAND—Maskinaktiebolaget Karlebo, Stockholm.

WORCESTER, MASS., U. S. A.

A REVIEW *of* RECENT PATENTS

Complete descriptions and drawings of any of the patents referred to on this page may be had for twenty five cents. Address orders to Wire & Wire Products, 551 Fifth Avenue, New York City.



Mechanism For and Method of Forming Wire Articles 1,701,532

No. 1,701,532. MECHANISM FOR AND METHOD OF FORMING WIRE ARTICLES. Patended February 12, 1929, by John M. Glaser, of Buffalo, New York, Assignor to U. S. Hame Company, of Buffalo, New York. This invention relates to processes and mechanisms for forming wire articles and particularly articles of the kind having a series of angular bends, therein, such, for example, as frames, loops and the like. By this method and mechanism a length of wire may be bent about a mandrel and in which the ends of the wire are bent toward and into substantial alignment with each other by means of laterally movable dies which are loosely mounted to first bend the ends of the wire approximately into their final position, which laterally movable dies are then engaged by a back die which moves the laterally movable dies at an angle to their lateral movement to press the ends of the wire into their final positions on the mandrel, thereby making it possible to bend the end portions of the wire around the sharp corners of the mandrel and into substantial alignment with each other without nicking or otherwise damaging the wire by the side dies.

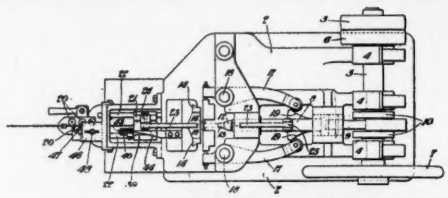
No. 1,701,098. NAIL MACHINE. Patented February 5, 1929, by Edwin F. Brown, of Cleveland, Ohio, Assignor to the American Steel and Wire Company of New Jersey. The patentee has provided a stock or wire feeding mechanism for nail-making machines, which may be set to feed definite lengths of stock, which is fed into the machine through a series of straightening rollers and then through a novel wire feeding block into and through the dies.

No. 1,700,906. MEANS OF SEVERING TRAVELING WEBS OF MATERIAL INTO STRIPS. Patented February 5, 1929, by Walter Everett Molins, of Deptford, London, England. While this invention relates particularly to an apparatus for cutting strips of cork in cigarette making, the same may be applied to any type of machine wherein a strip of material (wire, or the like) is continuously fed through the machine and adapted to be severed into lengths. The device comprises a rotary blade and a fixed blade having the cutting edge thereof curved away from the edge of the rotary blade and shaped in such a manner that the extremities of the two blades simultaneously engage with one another, as the rotary blade revolves, and thereafter shear one over the other to terminate the cutting operation at substantially the mid-width of the two blades.

No. 1,702,684. WIRE FABRIC. Patented February 19, 1929, by Perry T. Coons, of Montclair, New Jersey, Assignor to the American Steel and Wire Company of New Jersey. This invention relates to wire fabric and more particularly to a paper-backed wire fabric usable as a reinforcement and support for plastic material such as plaster, stucco, cement, concrete, and the like. There are two sets of wires provided, forming a mesh and welded together, one set on either side of the paper, openings in the paper being provided to effect welding of the two sets.

No. 1,702,756. EYELETED TERMINAL FOR FLEXIBLE BRAIDED CONDUCTORS AND METHOD OF MAKING SAME. Patented February 19, 1929, by Joseph Lester Woodbridge, of Philadelphia, Pennsylvania. This invention comprises a flexible braided conductor consisting of strands of wires of which all extend uninterruptedly throughout the length of the conductor, and groups of said strands being arranged in spaced relation at a point near one end of the conductor to provide a widened eyeleted terminal.

No. 1,702,304. WIRE RECESSING. FILLING. AND STRAIGHENING MACHINE. Patented February 19, 1929, by Charles J. Kotchi, of Chicago, Illinois, Assignor to Koro Corporation, of Chicago, Illinois. The object of this invention is to provide a machine which will perform the above mentioned operations on wire or similar material, the filling being a flux, and the wire being cut, by the machine, in predetermined lengths. The finished product is, of course, used in welding operations.



Nail Machine 1,701,098

No. 1,701,250. CLIP BENDING DIE. Patented February 5, 1929, by Harry M. Young, of Webster Groves, Missouri, Assignor to Calumet Steel Company, of Chicago, Illinois. In clinching the prongs of the U-shaped wire clips, used in securing anchor plates to rolled metal fence posts, it is claimed that in the use of the clip-bending dies now in use, difficulty has been experienced in the prongs of the clips breaking off during the clinching operation. In the above, means are provided for moving dogs toward each other for bending the prongs inwardly and thereafter forcing the dogs downwardly for clinching the bent-over prongs.

No. 1,701,095. WIRE FASTENING DEVICE. Patented February 5, 1929, by Edward L. Benedict, of Pittsburgh, Pennsylvania, Assignor to Pittsburgh Steel Company, of Pittsburgh, Pennsylvania. This invention relates to a device for supporting wire mesh fabric, in connection with the formation of walls, ceilings, etc., so that the stucco applied will imbed the wire mesh. The device comprises a nail, with spacing coil surrounding its shank, and studs on the shank in position to be engaged by the coil.

No. 1,701,308. CABLE BUMPER. Patented February 5, 1929, by Ralph H. Rosenberg, of Syracuse, New York, Assignor to American Cable Company, Inc., a Corporation of Delaware. The impact element of this bumper comprises a plurality of stranded wire cables (or the like, held in spaced relation by a suitable clamping device under tension between the ends of a resilient supporting bar, adapted to be secured to a vehicle.

No. 1,702,124. CONDUCTOR SUPPORT. Patented February 12, 1929, by Samuel S. Matthes, of Mansfield, Ohio, Assignor to the Ohio Brass Company, of Mansfield, Ohio. This invention relates to a hanger for connecting two conductors together and particularly to that class of construction known as catenary construction used in the suspension of a trolley wire conductor from an overhead cable.

DIGEST *of* RECENT TRADE LITERATURE

Electric Telemeter and Valve Spring Surge. Paper presented at Annual Meeting, Society of Automotive Engineers, Detroit, January 1929.

W. T. Donkin and H. H. Clark, Engineers, Cleveland Wire Spring Co., report that the electric telemeter presents an excellent means for investigating the phenomenon of valve spring surge. The telemeter is connected across the points of a stiff C-spring, one end of which is held against the valve spring in such a way that vibrations of the spring are transferred to the C-Spring and thence to the telemeter. This equipment has made it possible to identify the cause of valve spring surge as a resonant condition at certain speeds. Except at low engine speeds, the stress conditions of a spring having resonant points are much worse than is indicated by the conventional stress-formula, both as to degree and as to the rapidity of the stress cycle. Surge and stress conditions are improved by designing the springs for high frequency and by making the pitch variable so that the frequency is variable as the valve lifts, thus eliminating resonance.

Service Annealing of Sling and Crane Chains. Transactions of The American Society for Steel Treating, February, 1929. Page 193.

This paper, by William J. Merten, metallurgical engineer with the Westinghouse Electric and Manufacturing Company, discusses the inconsistent results in ductility and strength that are ordinarily obtained when chains are annealed at temperatures unsuited for links that have been severely deformed and cold-worked in service. The author recommends a uniform recrystallization of temperatures considerably above the transformation range to render the chain entirely safe for further service without resorting to a reduction of the safety load and basing the calculation of permissible stresses on the average cross sectional dimensions only.

Static Deflection of Helical Springs. Machinery, March, 1929. P. 492.

A series of charts for quickly determining the deflection and fiber stress in compression and extension springs is presented and discussed by J. W. Rockefeller, Jr., consulting engineer. There are four charts, two for use in designing helical springs of circular section wire in both Washburn & Moen and Brown & Sharpe gauges, and two for helical springs of square stock of any material. The text explains the author's chart notations and supplys directions for using them.

Trade Literature Received

Wire Drawing Dies

"Un-Widia Alloy Dies—Bulletin No. 101." The first of a series of booklets to be issued in looseleaf form by the Union Wire Die Corp. 333 W. 52nd St., New York City. This booklet describes the origin of Widia metal, its adaptation to the purpose of wire drawing, methods of die manufacture, proper lubrication, and tabulation of results obtained. It will be of interest to any one interested in drawing any kind of wire in sizes above .010". The booklet is issued free, upon application to the publishers, and subsequent bulletins will be forwarded, when ready, to those requesting Bulletin No. 101.

Wire Cloth Hand Book

"Area in Square Feet or Inches at a Glance." Buffalo Wire Works Co., Buffalo, N. Y. 181 tables in handy size book form. Valuable ready reference for finding the area in terms of feet, inches and fractions of inches, not only of wire cloth but any other kind of material. For example, a piece known to be 50 inches long by 41 inches wide is found, on reference to the appropriate table, to contain 14 square feet, 2/12ths of one square foot, and 10/12ths of one square inch. Fractional inch calculations may be carried out to a greater degree of fineness when desired.

Alloy Resistance Wires

"Presenting Nichrome and Other Alloys" (R-28). Driver-Harris Company, Harrison, N. J. 68 pages. Illustrated. Data and specifications pertaining to alloys for electrical resistance. Round and ribbon wires of pure nickel and six nickel alloys are thoroughly discussed as to properties, application, temperature characteristics and specific resistance. Various types of heater cord are described and illustrated in their actual application to household and industrial electrical equipment, and there are several pages of useful data about electrical wiring, weights, temperatures, gauges, etc.

Laboratory Research

"Pictures from Bell Telephone Laboratories". Bell Telephone Laboratories, 463 West St., New York City. 72 pages. Pictorial review of the company's research activities for the past fifty-three years. Includes the evolution of apparatus, methods, equipment and processes from the first Bell telephone to talking motion picture mechanism.

Cable Terminals

"Indoor Cable Terminals" and "Junction and Joint Boxes." Standard Underground Cable Co, 17th and Pike Sts., Pittsburgh, Pa. Illustrated catalogues with wiring diagrams and instructions, cable rating tables, and other engineering data.

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Wire Working Machinery
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Paper Clip Machines	Wire Nail Machines
Tack Machines	Spring Machines
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Screw Eye Machines	Rivet Machines
Shavers & Slotters	Cut Nail Machines
Riveting Machines	Draw Benches
Wire Pointers	Bull Blocks
Wire Rolling Mills	4 Slide Wire Machines
Headers of all kinds	Wire Cutters & Straightners
Bolt & Nut Machines	Staple Making Machines
Tapping Machines	
Cotter Pin Machines	

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The Waterbury Wire Die Co.

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DIAMOND TOOLS
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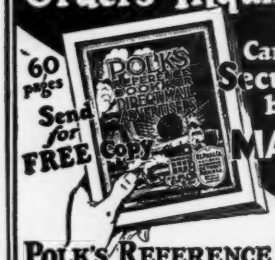
Orders-Inquiries



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Foreign Wire Trade Developments

Imports of iron and steel wire products into the United States
(In gross tons)

Item	January, 1929	December, 1928	January, 1928
Barbed wire	285	831	350
Round iron and steel wire	602	443	304
Steel telegraph and telephone wire	.....	.....	36
Flat wire and strip steel	149	256	135
Wire rope and strand	133	157	94
Other wire	41	90	41
Nails, tacks and staples	708	799	181
Bolts, nuts, rivets, and washers	18	51	25

Exports of iron and steel wire products from the United States
(In gross tons)

Item	January, 1929	December, 1928	January, 1928
Plain wire	3,845	3,522	3,775
Barbed wire and woven wire fencing	6,529	5,371	5,314
Wire cloth and screening	152	203	185
Wire rope	620	610	485
Insulated wire and cable	163	45	54
Other wire and manufactures of	926	700	701
Wire nails	1,498	1,007	1,477
Nails other than wire	836	804	664
Tacks	58	75	72
Horseshoes	21	48	55
Bolts, nuts, rivets, except track	1,411	857	867

Crude Rubber Consumed in Insulated Wire and Cable Compounds
(Compiled by The Rubber Association of America)

1928	1927	1926	1925	1924	1923	1922	1921
		Sales Value Manufactured Products Shipped (in dollars)					
34,432	34,075	35,487	33,379	30,214	32,076	21,955	11,717
		Crude Rubber Consumed (long tons)					
3,444	3,481	3,047	3,201	2,875	3,319	2,198	1,048

Wire Product Imports

RECEIPTS of card clothing increased in January to 38,432 square feet valued at $58,829; from 24,611 square feet valued at $37,156 in December. The principal source of this item was the United Kingdom with 32,037 square feet ($48,379), while Germany with 6.357 square feet ($10,369) was the only other country of any importance.

Imports of wire cloth and screening increased from 45,314 square feet in December to 126,-043 square feet in January. Of this latter amount, 90,945 square feet were of German origin, while 18,717 square feet were received from France, 13,938 square feet from Canada, and 2,443 square feet from the United Kingdom.

Imports of wire heddles continued to increase, amounting to 4, 915,000 pieces, as compared to 3,406,000 pieces during December. Germany was the principal supplier of this item, with 2,286,000 pieces, while France with 1,160,000 pieces was second. Switzerland with 727,000 pieces third, the United Kingdom with 500,000 pieces fourth, the remaining 242,000 pieces coming from Belgium.

Britain's Greatest Cable Expert Dies

SIR John Denison-Pender, chairman of the Eastern and Associated Cable Companies, died on March 6, at the age of 73, at his London, England, residence. In the recent negotiations for the merging of cables and wireless he played an important part. Last July an important merger of cable companies was announced, when the Eastern group, a party of the wireless cable merger, acquired the shares of the Direct West India Cable Company, Limited. This carried with it the control of three other cable companies, so that the group owned 8,000 miles of cables, has 22 cable stations operating

throughout the British West Indies, and owned wireless stations in addition at Bermuda and Jamaica. The group has been working wireless for more than 30 years.

Sir John was the third son of Sir John Pender, the pioneer of submarine telegraphy, who, after the failure of the first Atlantic Cable Company owing to the breaking of a cable in mid-ocean during the historic voyage of the Great Eastern steamship, gave his personal guarantee for 250,000 ($1,250,000), with the result that in 1886 the Great Eastern not only recovered the broken cable, but successfully laid another of greater strength and value.

In 1878 Sir John began his long connection with the Eastern Telegraph Company and its associates, the first great British cable group, which was the result of his father's organizing and financial ability. In 1881 he was made a director of the Eastern Company, and twelve years later was appointed managing director. In 1896, the year of his father's death, in harness, he was made deputy chairman, and in 1917 on the death of Sir John Wolfe Barry, he became chairman, his son, J. C. Pender, succeeding him as managing director.

Canada May Tax Rods

THE Canadian proposals for changes in import duties and sales taxes, included in the budget speech by the Minister of Finance to Parliament on March 1, and provisionally in effect March 2, provision is made under item 779a for the application of the rates of one-half cent per pound general, one-fourth cent intermediate, and free, preferential, to copper rods, when imported by manufacturers for use in their own factories in the manufacture of electrical conductors, the individual units of such electrical conductors not to exceed the area of No. 7/0 gauge conductor. This item may be substituted for the present item 779, if the governor in council is satisfied that any copper bars are being sold in the country of export for consumption at a lower price than for export to Canada. (The present item 779 admits such products free from all sources.)

Propose Indian Tariff Revision

THE Indian Tariff Board has recommended that the Government of India take early action for the removal of the present import duty of 15 per cent ad valorem on electrolytic copper rod and impose an import duty of 5 per cent ad valorem on rubber-insulated electrical wire and cables other than those specified under statutory item 90A of the Indian customs tariff and dutiable at 15 per cent ad valorem, namely, insulated copper wires and cables, any one core of which has a sectional area of less than one-eightieth part of a square inch, and wires and cables of other metals of not more than equivalent conductivity.

New Wire Netting Entente

Assistant Commercial Attaché Daniel J. Reagan, at Paris, advises that, according to the current French press, negotiations are already under way in Paris looking toward the establishment of an international entente among the leading producers of wire netting. It is said that these meetings are being attended by representatives from the French, Belgian, Dutch, German, British, and Danish industries.

Joins British Wire Concern

Karl H. Marsh, chief engineer at the Buffalo plant of the Wickwire Spencer Steel Co., Inc., New York, has resigned to become identified in a similar capacity with the British Empire Steel Corporation, with headquarters at Sydney, N. S. He served as chief engineer of the Dominion Steel Corporation, a subsidiary of the British Empire Company, from 1919 to 1923.

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(U. S. Patent 1,624,027. April 12, 1927.)
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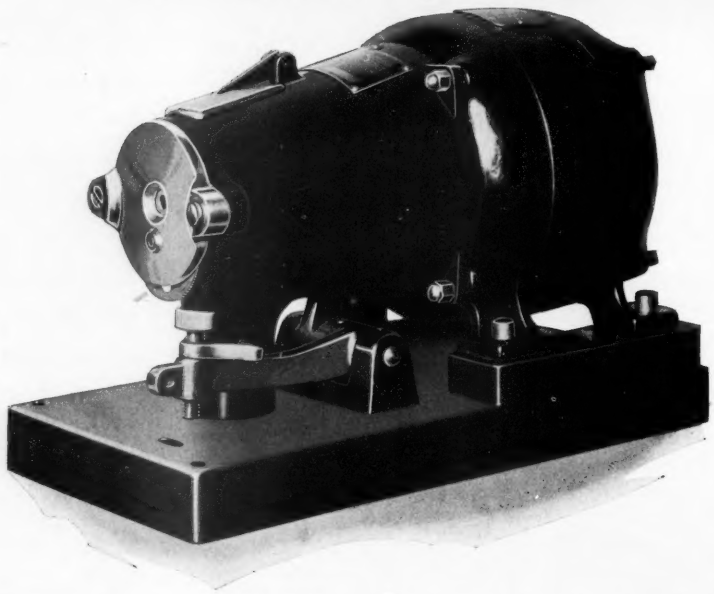
Manufacturers of
"RED HEAD"
SHIPPING REELS MACHINE
for the Wire & Cable Industry

New Perfection Wire Stripper



THE Perfection Wire Stripper, manufactured by Weber Machine Corp., 33 South Water Street, Rochester, N. Y., is designed to put wire stripping on a production basis. It removes any kind of insulation from the ends of solid, stranded tinsel, multi conductor cable, or wire up to ½" diameter. The cutting knives are circular and made from special alloy steel. A new cutting edge may be obtained by turning the knives slightly. Knives are quickly replaced and inexpensive. Adjustments for length or diameter of wire are easily and quickly made. The machine is connected directly to the motor and will plug in a lamp socket.

Besides Model A, which is illustrated, the Perfection is also made in Model B, designed for use where unlimited lengths of wire or taps at any interval along the wire to be stripped. The machine is mounted on a stand and belt driven from a motor or mounted on a bench and driven from a line shaft. It is claimed that any intelligent girl can quickly become a proficient operator of either model.

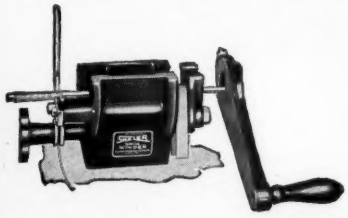
Magnetic Plating Holder for Small Parts

CLIMAX Machinery Company, 121 East Morris Street, Indianapolis, Ind., is putting on the market a magnetic holder to speed up the chromium plating of small parts such as screws, nuts, bolts, rivets, hooks and other small iron or steel items. The Climax Magnetic Holder consists of a series of magnets attached to negative work rods directly opposite each other. The work to be plated is placed on these magnets, which hold the pieces in place without wires or other stringing. Time is saved by the loading of one rod of magnets with work while the other is plating. The magnets with work attached are taken out of the solution by turning the rod around so that the magnets swing upward. Another turn puts the magnets and new work back in the solution. It is claimed that simplicity of construction, ease of operation, and improved means of providing electrical contact make the Climax highly efficient as a labor and time saving device for producing good chromium plated parts.

Units are manufactured in standard sizes for regular plat-

ing tanks or to specification for particular uses in dual, quadratic or hexagonal series. Units are also made for automatic conveyors. Each magnetic holder is equipped with a special charging device which has been designed to re-magnetize the magnets without removing them from the work rod. Recharging is necessary, it is estimated, about once in six months, and a six-foot rod of magnets can be recharged in five minutes.

New Spring Making Device



A new and simple device for which it is claimed that any type of coil spring can be accurately and perfectly made in a few minutes time is being placed on the market by The Shaler Company, Milwaukee, Wis. The device can be operated without previous experience or skill and is especially designed to facilitate replacing broken or worn out coil springs on machinery and equipment without the inconvenience and delay necessitated by waiting for replacements.

The process of spring making consists of inserting the wire and turning the handle until the desired length is obtained. Pull or compression springs can be made from the smallest size to one and seven-eighths inch diameter, in any size wire from the smallest up to and including five thirty-seconds. Compression springs, accurately spaced, with both ends neatly squared, can be duplicated over and over again because of the positive space adjustment which is easily regulated up to and including five-eighths inch. Equipment supplied with the spring winder includes five arbors of the most commonly used diameters and three rolls of wire—.041, .055 and .082.

Promotes unhindered acid action

PICKLING acids work unhindered, when wire is cleaned the Oakite way. With every trace of grease, oil and dirt removed from the wire by Oakite materials and methods, acid works uniformly in a fraction of the usual time.

And, because Oakite cleaning rids wire of the grime that retards pickling, less acid is required to do a better job; acid pollution is reduced to a minimum. Pickle solutions last longer. Action is certain and speedy.

Let our Service Man tell you how Oakite materials and methods will effect production economies in your mill. A postal to us will bring him. No obligation.

Oakite Service Men, cleaning specialists, are located in all the leading industrial centers of the United States and Canada

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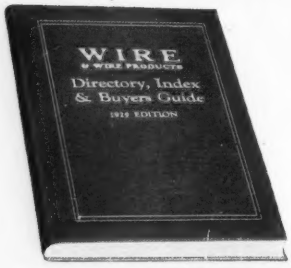

WIRE
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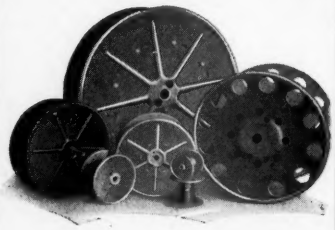

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Corporation
13 Lamb St., Attleboro, Mass.

Specialists in development of steel reels for annealing, vulcanizing and stranding; also bobbins for wire weaving.

The New Cable to the Azores

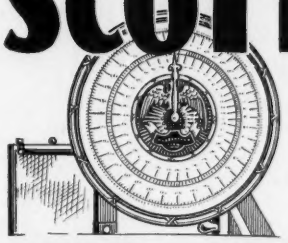
THE Western Union Telegraph Co. has just recently opened to public use its new cable between Bay Roberts, Newfoundland, and Horta, in the Azores. Its length is about 1,341 nautical miles, and it was laid at a cost of almost $2,000,000. It is considered the fastest cable in the world, and will serve as an important additional link between America, Germany, Spain, Italy, and Africa.

Aside from its commercial significance, it represents a new departure in cable construction, because of new principles of electrical engineering which permits it to be worked duplex, or at full capacity simultaneously in either direction. Eight separate messages may be transmitted over the cable at the same time, four incoming and four outgoing. The new cable was manufactured by the Telegraph Construction & Maintenance Co., of London. The cable employs three different types of core, as well as mumetal alloy, consisting of nickel, cobalt, and iron. The use of this new alloy is one of the chief factors which permits the sending of four messages in each direction at the same time.

Unique Construction

The two ends of the cable, extending about 160 miles from shore, have a core consisting of 500 pounds of copper per nautical mile, and 300 pounds of gutta percha per nautical mile. The next section, which is about 70 miles long on each end, has a core of 325 pounds of copper, 50 pounds of mumetal, and 270 pounds of gutta percha per nautical mile. The main deep-sea section has a core which contains 280 pounds of copper, 60 pounds of mumetal, and 225 pounds of gutta percha per nautical mile. The entire section of the central conductor is surrounded by five spirally wound copper strips around which, in the form of small wire, is closely wrapped the mumetal.

SCOTT



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Adjustable for No. 3 to No. 24 Gage Wire.

The cut on the left shows a few of the thousands of the forms made on this

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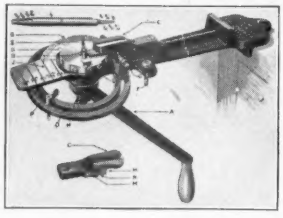

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Originators of forms, "Evidence of Conception."

Results of Simplified Practice in the Woven Wire Fence Industry

(*Continued from page 116*)

Practice will do all that is claimed for it by making for smaller inventories, quicker turnover, lower selling expense and less obsolescence. We would like to see the plan extended to a great many more lines."

A second wholesaler said: "We are vitally interested in at least 25 items in your simplified practice recommendations. Of this amount, I think that we are using fully 100% of the simplified suggestions, and are very much encouraged over the adoption of same.

"It has enabled us to keep our stocks in better shape, get a larger turnover, give better service to the dealers and consumers, and is certainly netting us a larger net profit.

"We think there is still room for further reduction of sizes, styles, and so forth, in the various lines, that we are interested in, and we certainly hope that the good work will continue, and can assure you that we will do everything within our power to help you in any way that we can to bring about the desired results."

Another reported: "There is no question but that it really pays to simplify a line of products. For it does develop smaller inventories, quicker turnover, smaller selling expenses, smaller cost for stock and cost records, and a saving in salesmen's catalog, maintenance, etc.

"A shorter line enables the wholesaler to maintain full stocks, thereby eliminating the loss of effort, waste and profit through the shortage, or back ordering of items already sold. It also enables his traveling salesmen to concentrate with a larger sales result more intensively on the selling of a certain items and lines—creating a more profitable customer. This is not the case with a very long line, and a wide range, with the result that the customer buys only what he needs."

A retail lumberman's association after making inquiries among its membership, informed the Department of Commerce: " * * * item nine of the 79 Simplified Practice Recommendations has been a great saving * * * in the way of handling expense and storage capacity.

"In taking this matter up with the different dealers, they all report a saving of from 10 to 12% on this one commodity. Perhaps this is a little strong on the part of some, but in our own yard we figure this at 4 to 5% saving.

"As to our own selves, we have been able to stock more of the staple articles taking up a less amount of room than here-to-fore, which also means considerable less expense in keeping our stock sheet."

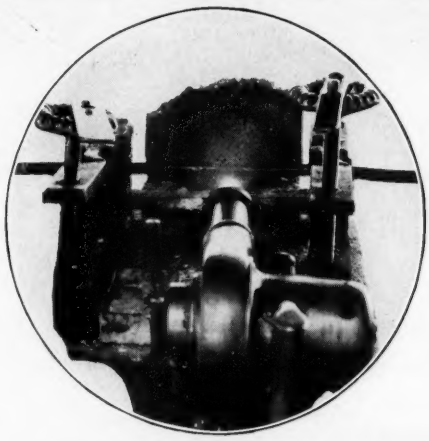
Consumers

Consumers are enjoying better service, more dependable quality, and a protection against under-gauge products when they purchase the simplified styles of fencing. One correspondent, explaining that he has had little experience with many of the simplified commodities, said: "* * * but, of course, as a farmer and using woven-wire fencing, I know that it is a benefit to have fewer patterns and greater standardization in fencing."

That the users are quick to realize the advantages of purchasing simplified styles can be seen from such remarks as the following, taken from the letter of one wholesaler: "We find that this enables us to reduce the number of items necessary in each line and concentrating on these sizes, enables us to have a full stock at all times, of the staple and salable items. Although there is still some call for some of the sizes or kinds of material eliminated in these schedules, we do not find it difficult to suggest other sizes to the consuming trade or dealer trade."

Conclusions

It is evident that the simplification of woven-wire fencing



Welding Wire Rod.

Wire Mills Use
"HANDY"
SILVER SOLDERS

(A) For brazing the heavy wire rod preparatory to cold-drawing through reducing dies. (See cut above)
(B) For splicing wire when it breaks at the dies. (See cut below)
(C) For splicing short-lengths to make complete reels or spools.

BECAUSE

1. "Handy" silver solder makes neat, strong joints, speedily.
2. It has a high factor of resistance to corrosion from acid or alkaline enemies, as well as atmosphere.
3. It has a high electrical conductivity.
4. It is a known quantity to work with—as each "Handy" formula is guaranteed to be accurate.

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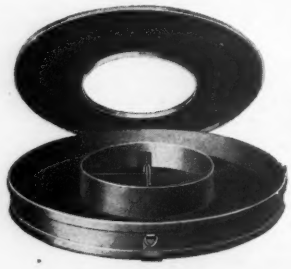

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OUR WIRE MACHINERY CATALOGUE SENT ON REQUEST

(*Continued from page 137*)

and fence packages has been of material benefit to the manufacturers, distributors and users of this commodity. Furthermore, the majority of distributors answering our inquiry are familiar with other simplified practice recommendations in the hardware field and made favorable comments regarding them.

The reader will get a better idea of the elements operating to make the woven-wire fencing recommendation effective from the following:

Manufacturers who have accepted	13
(Producing more than 80% of the total national output.)	
Manufacturers Association	1
Distributors	87
Users	25
Distributor Associations	4
Organized Consumer Groups	10
Total Accepters	140

These accepters are located in 39 states, Alaska and the District of Columbia. Ten establishments of the Federal Government are also on the accepter list.

Welding Characteristics of Copper Alloys

(*Continued from page 122*)

welding difficult, and the amounts present in bearing brasses make a high-strength weld impossible. The reason for this is that lead does not alloy with copper, brass and bronze, but is scattered through the metal in small particles. When the alloy is fused, the molten lead does not mix with the molten copper alloy, but being heavier than the rest of the metal, sinks to the bottom of the weld. Its low melting point also causes it to boil out and leave the weld porous and weak.

With a few exceptions such as the lead-containing bearing bronzes just mentioned, it may be stated that the copper alloys are weldable when proper precautions are taken. In repair work the results are usually quite satisfactory. When production welding of these copper alloys is contemplated it will pay to use an easily weldable alloy that will also meet the other requirements.

Making Bismuth Wire by the Extrusion Process

(*Continued from page 123*)

The bismuth wire is pliable so that it can be wound up on a spool as fast as it is formed. It can be wound around a ⅛ inch rod and straightened out again or bent several times in one place without breaking if care is exercised. It possesses good tensile strength but may break if bent under compression, i. e., if a short piece is bent by pushing on the ends it is almost certain to fail.

The wire can be extruded at room temperature but less pressure is required when the press is heated. The physical properties of the wire appear to depend upon the extrusion temperature, but no very reliable data have been obtained so far. It suffices to say for the present that wires made at temperatures from 25°C to 100°C have proven satisfactory mechanically. N. Johnston and S. F. Morgan found in 1924 that the material would extrude somewhat explosively in the form of a powder when the temperature was too high and the pressure was applied suddenly.

They succeeded in extruding a piece of antimony wire several feet long and had no difficulty whatever in producing bismuth-tin alloy wires of various compositions up to 100 per cent tin. The antimony wire was exceedingly brittle, but the alloy wires were in general more pliable than those of pure bismuth. A number of them could be tied in tightly closed knots.

The preliminary experiments just mentioned and later ones in 1926 by M. W. Fort and P. V. Jewell indicated that there is an ageing effect in the case of at least some of the wires. It appears that the thermoelectromotive force per degree against copper, for example, may be different at the end of a day or more from what it was when the wire was first made.

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Accurate Size Smooth Draw

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An Electrical Test For Tin Coating on Copper Wire

(*Continued from page 119*)

2 is the corresponding curve of the chemical analysis and shows close agreement throughout the entire range with the average practically identical.

As stated previously, with the Grower process it is possible to determine free surface tin separate from the alloy. This is graphically shown in Curves 3 and 4. Curve No. 3 represents the free tin and No. 4 the copper-tin alloy always found to some extent in copper wire tinned by passing it through a hot tin bath. It should be noted that the amount of alloy is practically constant regardless of the amount of free surface tin. The amount of alloy may vary however depending upon the temperature cycle through which the wire passes. The use of this process greatly aids in the study of the amount of alloy formed.

Twenty Two Miles of Wire Rope in World's Greatest Air Ship

(*Continued from page 117*)

lounges, smoking rooms, cabins and a promenade deck which rival in spaciousness and appointments those on our great ocean liners.

The R.100 is powered by six Rolls-Royce Condor 700 h. p. motors, has a cruising radius of between 4,000 and 5,000 miles and a speed of 80 miles an hour. This is by far the largest amount of power and speed ever applied to an airship.

After the R.100 makes its demonstration flight across the Atlantic to the United States it will be put into regular, scheduled service between London, Egypt and India. Later on, the builders of this ship (who, by the way spent $2,500,000 on the construction of this craft) plan to put additional ships in service between such points as Canada, South Africa, Australia and New Zealand.

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For more complete information, consult the annual Directory, Index & Buyers' Guide.

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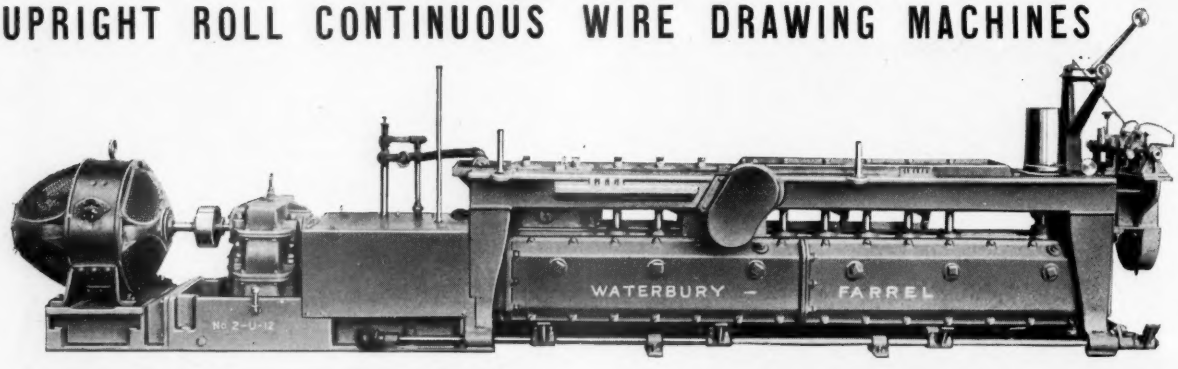

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